NON-PUBLIC?: N
ACCESSION #: 9205110155
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Palisades Plant PAGE: 1 OF 06

DOCKET NUMBER: 05000255

TITLE: UNPLANNED ACTUATION OF THE RIGHT CHANNEL OF THE SAFETY INJECTION
SYSTEM RELAYS WHILE PERFORMING A TECHNICAL SPECIFICATIONS SURVEILLANCE TEST

EVENT DATE: 04/06/92 LER #: 92-032-00 REPORT DATE: 05/06/92

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
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COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On April 6, 1992, at 2222 hours, with the plant in cold shutdown following refueling, an unplanned actuation of the right channel of the safety injection system (SIS-X) relays occurred. (The SIS-X relays are the safety injection system relays in the circuit with offsite power available.) At the time of the unplanned actuation, technical specifications surveillance procedure (TSSP) RT-8D, "Engineered Safeguards System - Right Channel," was in progress.

The cause of the event was an inadequate procedure. No precautions or detailed instructions on the proper method to coordinate the timing of pulling fuses and lifting jumpers was included in the technical

specifications surveillance procedure RT-8D.

Corrective action for this event includes adding instructions and steps to the technical specifications surveillance procedures to permit the proper coordination of pulling fuses and lifting jumpers, and updating the design basis document to enhance the description of the inherent time delays associated with the bus undervoltage relays.

END OF ABSTRACT

EVENT DESCRIPTION

On April 6, 1992, at 2222 hours, with the plant in cold shutdown following refueling, an unplanned actuation of the right channel of the safety injection system (SIS-X) relays BQ;RLY! occurred. (The SIS-X relays are the safety injection system relays in the circuit with offsite power available.) At the time of the unplanned actuation, technical specifications surveillance procedure (TSSP) RT-8D, "Engineered Safeguards System - Right Channel," was in progress. TSSP RT-8D is used to demonstrate the ability of the right channel engineered safety system (ESS) equipment to respond to a safety injection system (SIS) actuation coincident with a loss of offsite power.

One of the objectives of technical specifications surveillance procedure (TSSP) RT-8D, "Engineered Safeguards System - Right Channel," is to demonstrate the ability of equipment to respond to a Safety Injection System (SIS) actuation signal coincident with a loss of offsite power (LOOP). Such an event will cause the Design Basis Accident (DBA) sequencer to start safety related loads onto diesel generator 1-2.

During TSSP RT-8D, both the SIS and the LOOP are simulated. A low pressurizer pressure SIS is initiated by removing a temporary jumper that simulates the pressurizer at normal pressure. The LOOP is initiated by pulling fuses that supply 2400V AC power to the Bus 1D undervoltage sensing relays. To perform TSSP RT-8D, the SIS must be initiated after the LOOP event is started, but before the diesel generator output breaker closes.

As a point of reference, a LOOP without an SIS will cause the Normal Shutdown Sequencer (NSD) to start normal shutdown loads on diesel generator 1-2. An SIS without a LOOP will cause the SIS-X relays to simultaneously start safety related loads on Bus 1D which is being supplied power from an offsite source. This condition also load sheds Bus 1E, which is the non-safety related 2400V AC bus.

During the performance of TSSP RT-8D on April 6, 1992, the surveillance test was started with actions to simulate a LOOP, followed by actions to simulate an SIS. The proper sequence should have been: 1. LOOP, 2. load shed, 3. SIS and 4. DBA sequencer operation. The improper sequence that resulted was: 1. SIS, 2. SIS-X relays actuated, 3. LOOP, 4. load shed, and 5. DBA sequencer operation.

TSSP RT-8D meets the criteria of "infrequently performed tests or evolutions" as described in Palisades Administrative Procedure 4.00, "Operations Organization, Responsibilities and Conduct." TSSP RT-8D received independent validations by two different technical experts, one of which is a current licensed Senior Reactor Operator (SRO), as required by AP 4.00. All comments from these technical reviews were resolved prior to conducting the test.

To perform the simultaneous LOOP and SIS in TSSP RT-8D, the following two steps must be manually performed in a timely and closely coordinated manner.

Step 5.3.4: "Pull Bus 1D undervoltage potential transformer fuses..."

Step 5.3.5: "Remove jumper..."

To perform these two steps, several people, in various physical locations, must coordinate their actions as follows:

- Test engineer No. 1 coordinates this section of the test procedure and is stationed in the control room in visual sight of the C04 panel. The test engineer is in verbal contact with an electrician stationed inside the C12 panel.

- An electrician is stationed inside C12 panel, waiting for a verbal command from Test Engineer No. 1 to lift a jumper to simulate an SIS.

- An Instrument and Control (I&C) technician is stationed behind the C12 panel, waiting for a verbal command from Test Engineer No. 1 to start a Data Acquisition System (DAS).

- Test engineer No. 2 is stationed in the Bus 1D switchgear room and is in telephone communication with Test Engineer No. 1.

- An Auxiliary Operator (AO) is stationed behind Bus 1D switchgear cubicle 152-203, waiting for a verbal command from Test Engineer No. 2 to pull the fuses.

- A Laboratory Services engineer is stationed in front of Bus 1D, waiting for a verbal command from Test Engineer No. 2 to start a data recorder.

Prior to conducting the test, Test Engineer No. 1 recognized the importance of simulating the LOOP and the SIS in a proper and timely method and, therefore, wrote down the coordination method and discussed it with the other individuals involved with the test prior its start. Test Engineer No. 1 used the written notes, which expanded the level of detail of the TSS procedure steps, when coordinating the steps to pull the fuses and lift the jumper. The written notes used by Test Engineer No. 1 for TSSP RT-8D are described below.

1. When directed by the Shift Supervisor, Test Engineer No. 1 instructs Test Engineer No. 2 (via telephone) to begin the "countdown" to have the fuses pulled.

2. Test Engineer No. 2 acknowledges to Test Engineer No. 1 that countdown will begin.

3. Test Engineer No. 2 says in a loud enough voice to be heard by everyone in the Bus 1D switchgear room: "Starting countdown, ...5, ...4, ...3, ...2, ...1, ...pull fuses."

4. On the "2" count, the Lab engineer starts the data recorder.

5. On the command of "pull fuses", the auxiliary operator pulls the fuses to initiate the LOOP event.

6. When the voltage on Bus 1D begins decreasing toward zero, as indicated by the voltmeter on C04 panel, Test Engineer No. 1 gives the command to "lift the jumper."

7. Upon hearing the command to lift the jumper, the I&C technician "resets" the data acquisition system.

8. Upon hearing the command to lift the jumper, the electrician lifts the jumper, to initiate the SIS.

For the performance of TSSP RT-8D, the "second level" undervoltage relays

(127-8), are removed from service to assure the "first level" undervoltage relays are tested. Therefore, when the fuses are pulled, only the "first level" undervoltage relays (127-2) cause any automatic actuations when the zero voltage condition is sensed.

The "first level" undervoltage relays are the inverse time type, set for 77.5% of normal voltage. This means they will actuate on an undervoltage situation after a time delay, which is the inverse to how low the voltage decreases. This type of setting is coordinated to permit starting and accelerating large motors, while remaining responsive to a sudden loss of voltage. The setting of the "first level" 127-2 undervoltage relays to achieve this coordination results in approximately a three second delay between a zero voltage situation and when action is taken by the 127-2 undervoltage relays.

The "second level" undervoltage relays (127-8) are instantaneous devices, set for 92% of normal voltage. These units also have a fixed one-half second time delay before they actuate on undervoltage.

The three second delay in the operation of the 127-2 undervoltage relays was not foreseen by anyone involved in the performance of TSSP RT-8D. After the fuses were pulled, Test Engineer No. 1 gave the command to lift the jumper after observing the Bus 1D voltmeter falling towards zero; however, the 127-2 undervoltage relays were still in the three second time delay, therefore, the SIS logic circuit would not respond to the true undervoltage condition. As a result, the SIS signal from the lifted jumper was "processed" before the LOOP signal was "received."

Because the SIS signal was sensed before the LOOP signal, the logic circuitry reacted as if offsite power was available, therefore, the SIS-X relays were actuated. The SIS-X relays simultaneously started all safety related loads and shed Bus 1E. The LOOP signal then "arrived" approximately 1.2 seconds later, causing a load shed, the start of both diesel generators, and DBA sequencer operation.

This event is reportable in accordance with 10CFR50.73(a)(2)(iv) as a condition that resulted in the actuation of an engineered safety feature.

CAUSE OF THE EVENT

The cause of the event was an inadequate procedure. No precautions or detailed instructions on the proper method to coordinate the timing of pulling fuses and lifting jumpers was included in the technical specifications surveillance procedure in use at the time of the event.

The individuals involved with performing key steps in the procedure had no prior experience with this surveillance test procedure and were not totally aware of the techniques required for successful completion of the procedure. Furthermore, these techniques were not incorporated into the procedure.

This event does not involve the failure of any equipment important to safety.

ANALYSIS OF THE EVENT

Three days earlier, a similar surveillance test was performed on the left channel equipment using TSSP RT-8C. Essentially the same personnel conducted that test using the same techniques described above for the performance of TSSP RT-8D. For TSSP RT-8C, the normal and expected sequence of events occurred. A review of both surveillance test sequences indicates that the combined time for both the command to lift the jumper and the physical reaction time to perform the task was at least 1.2 seconds longer during the performance of TSSP RT-8C than during the performance of TSSP RT-8D. The three second delay in the operation of the 127-2 undervoltage relays was not realized at this time either.

Both TSSP RT-8C and TSSP RT-8D had been successfully performed in two previous outages without an SIS-X actuation. Due to personnel changes in the last year, however, no "institutional knowledge" or prior experience remained to supplement the procedure.

On April 7, 1992, TSSP RT-8D was repeated using a modified method without any problems. Step 6 of the written notes for the test procedure was revised such that the test engineer waits for the 127-2 undervoltage relays to actuate to open the offsite power feed breaker to the bus before giving the command to "lift the jumper." This revised step automatically incorporates the inherent time delay of the 127-2 undervoltage relays before the relays actuate due to the undervoltage condition.

CORRECTIVE ACTION

The corrective action for this event is as follows.

1. Add additional instructions and steps to TSSP RT-8C and TSSP RT-8D to permit the proper coordination of LOOP and SIS.

2. Update Design Basis Document 3.04, to enhance the description

of the inherent time delays associated with the bus undervoltage relays.

ADDITIONAL INFORMATION

None

ATTACHMENT 1 TO 9205110155 PAGE 1 OF 1

Consumers
Power

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May 6, 1992

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DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -
LICENSEE EVENT REPORT 92-032 - UNPLANNED ACTUATION OF THE RIGHT CHANNEL
OF THE SAFETY INJECTION SYSTEM RELAYS WHILE PERFORMING A TECHNICAL
SPECIFICATIONS SURVEILLANCE TEST

Licensee Event Report (LER) 92-032 is attached. This event is reportable in accordance with 10CFR50.73(a)(2)(iv) as a condition that resulted in the actuation of an engineered safety feature.

Gerald B Slade
General Manager

CC Administrator, Region III, USNRC
NRC Resident Inspector - Palisades

Attachment

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